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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,424	11/26/2003	Mark J. Hampden-Smith	41890-01626	6234
25231	7590	09/11/2006		
MARSH, FISCHMANN & BREYFOGLE LLP 3151 SOUTH VAUGHN WAY SUITE 411 AURORA, CO 80014				
			EXAMINER VANOV, TIMOTHY C	
			ART UNIT 1754	PAPER NUMBER

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/723,424

Applicant(s)

HAMPDEN-SMITH ET AL.

Examiner

Timothy C. Vanoy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-98 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-98 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>Aug. 21, 2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on Aug. 21, 2006 has been entered.

Specification

- a) It is requested to reduce the number of claims in this application to about 20 to 25 because examining 98 claims is unduly burdensome.

Double Patenting

- a) Claims 1-98 of this application conflict with claims 1-65 of Application No. 10-996,791. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

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b) A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 1-98 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-43, 45 and 48-65 of copending Application No. 10-996,791.

This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

c) The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-98 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-65 of copending Application No. 10-996,791. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of 10-723,424 and 10-996,791 disclose a method for converting a carbon-based fuel into a hydrogen-rich product gas, comprising:

- (a) providing a carbon-based fuel;
 - (b) converting the carbon-based fuel into an intermediate gas product by contacting the carbon-based fuel with at least a first conversion catalyst;
 - (c) contacting said intermediate gas product with an absorbent material to absorb CO₂ and form a H₂-rich gas;
 - (d) extracting said H₂-rich gas from said contacting step;
 - (e) regenerating said absorbent, and
 - (f) repeating said steps (a), (b), (c), (d) and (e) at least about 10 times,
- wherein said absorbent material retains at least about 50 mol. % of said theoretical absorption capacity after each of said repeating steps.

The difference between the claims of 10-723,424 and the claims of 10-996,791 is that claims 44, 46 and 47 in 10-996,791 describe the temperature; gas hourly space velocity and water:carbon ratio in the same process, however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is reasonably expected that the same process will inherently operate at the same claimed temperatures; gas hourly space velocity and

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water:carbon ratios. Please note that the courts have already determined that mere recognition of latent properties in the prior art does not render nonobvious an otherwise known invention: please see the discussion of the *In re Wiseman* 596 F.2d 1019, 201 USPQ 658 (CCPA 1979) court decision set forth in section 2145(II) in the MPEP, 8th Ed., Rev. 3, Aug. 2005.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The person having ordinary skill in the art has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article titled "Hydrogen production from coal by separating carbon dioxide during gasification" by S. Lin et al.

The abstract of the Lin et al. article reports that hydrogen generation during the reaction of a coal/calcium oxide mixture with steam was investigated. Coal, calcium oxide and carbon monoxide reactions with steam and carbon dioxide absorption by calcium hydroxide or calcium oxide occurred simultaneously in the experiment. It was found that hydrogen was the primary resultant gas and carbon dioxide was fixed into calcium carbonate.

The difference between the applicants' claims and the Lin et al. article is that the applicants' claims call for repeating the absorption and regeneration step at least 10 times, wherein the absorbent material retains at least about 50 mol % of the theoretical absorption capacity after each of the said regenerating steps, however it is submitted

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that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is reasonably expected that the process disclosed in the Lin et al. article would also undergo the same number of absorption and regeneration steps when treating the same gas with the same amount of carbon dioxide with the same absorbent in the same quantity, as a function of mass balance.

Claims 1-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article titled "Hydrogen Production Using Sorption-Enhanced Reaction" by A. Lopez Ortiz et al.

The abstract of the Lopez Ortiz et al. article discloses the sorption-enhanced production of hydrogen via the steam-methane reforming process using a mixture of nickel-based reforming catalyst and a calcium-based sorbent. The rates of the reforming, water-gas shift and carbon dioxide removal reactions are sufficiently fast that combined equilibrium was closely approached, allowing for greater than 95 mol % of hydrogen to be produced in a single step.

The difference between the applicants' claims and the Lopez Ortiz et al. article is that the applicants' claims call for repeating the absorption and regeneration step at least 10 times, wherein the absorbent material retains at least about 50 mol % of the theoretical absorption capacity after each of the said regenerating steps, however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is reasonably expected that the process disclosed in the Lopez Ortiz et al. article would also undergo the same number of

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absorption and regeneration steps when treating the same gas with the same amount of carbon dioxide with the same absorbent in the same quantity, as a function of mass balance.

Claims 1-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 6,682,838 B2 to Stevens.

Claim 1 in the Stevens patent describes a process for converting a hydrocarbon fuel into hydrogen-rich gas, comprising:

reacting the hydrocarbon fuel with steam in the presence of a reforming catalyst and a carbon dioxide fixing material to produce a first hydrogen gas;

removing carbon monoxide from the first hydrogen gas to produce the hydrogen-rich gas, and

regenerating the carbon dioxide fixing material by heating the carbon dioxide fixing material to a temperature of at least about 600 °C.

The difference between the applicants' claims and the Stevens patent is that the applicants' claims call for repeating the absorption and regeneration step at least 10 times, wherein the absorbent material retains at least about 50 mol % of the theoretical absorption capacity after each of the said regenerating steps, however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is reasonably expected that the process disclosed in the Stevens patent would also undergo the same number of absorption and

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regeneration steps when treating the same gas with the same amount of carbon dioxide with the same absorbent in the same quantity, as a function of mass balance.

Claims 1-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent Application Publication US 2002/0085967 A1 to Yokota.

Claim 1 in the Yokota patent describes a process for generating hydrogen, comprising:

contacting a gas comprising fuel and steam with a reactor bed comprising a reforming catalyst and a carbon dioxide absorbent, thereby converting the gas into hydrogen and absorbing the co-generated carbon dioxide into the carbon dioxide absorbent, and

heating the reactor bed, thereby desorbing the carbon dioxide from the absorbent and regenerating the absorption capacity of the absorbent.

The difference between the applicants' claims and the Yokota application is that the applicants' claims call for repeating the absorption and regeneration step at least 10 times, wherein the absorbent material retains at least about 50 mol % of the theoretical absorption capacity after each of the said regenerating steps, however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is reasonably expected that the process disclosed in the Yokota application would also undergo the same number of absorption and regeneration steps when treating the same gas with the same amount of carbon dioxide with the same absorbent in the same quantity, as a function of mass balance.

Claims 1-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 4,231,760 to Lancet et al.

Claim 1 in the Lancet et al. patent describes a process for producing synthesis gas by reacting a carbonaceous fuel with water in the presence of a carbon dioxide acceptor comprising calcium oxide to produce a synthesis gas rich in hydrogen with at least a portion of the produced carbon dioxide being reacted with the calcium oxide to produce calcium carbonate.

The difference between the applicants' claims and the Lancet et al. patent is that the applicants' claims call for repeating the absorption and regeneration step at least 10 times, wherein the absorbent material retains at least about 50 mol % of the theoretical absorption capacity after each of the said regenerating steps, however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is reasonably expected that the process disclosed in the Lancet et al. patent would also undergo the same number of absorption and regeneration steps when treating the same gas with the same amount of carbon dioxide with the same absorbent in the same quantity, as a function of mass balance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy C. Vanoy whose telephone number is 571-272-8158. The examiner can normally be reached on Mon-Fri 8-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman, can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Timothy C Vanoy
Timothy C Vanoy
Primary Examiner
Art Unit 1754

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